move the moſt inveterate Caſes. I am with all Reſpect, Sir,

Your moſt obedient and humble Servant,

Tho. Shaw.

II. *A brief Account of ſome of the Effects and Properties of Damps, in a Letter to* William Rutty, *M. D. R. S. Secr. from Mr.* Iſaac Greenwood, *Profeſſor of Mathematicks at* Cambridge, New England.

SIR,

YOUR obliging Letter I received not till about Half a Year after the Date thereof; and have been lead on to ſo long and criminal a Delay of my Anſwer, in Hopes of procuring ſomething that might be worthy of your Notice.

I have now ſent you incloſed, a brief Account of two Inſtances of the deadly Effect of vitiated Air upon Animal Life.

If ſuch Experiments as I have made on the Damp therein mentioned, be of any Importance in the Diſcovery of the true Cauſe of this wonderful *Phænomenon*, I ſhall have attained my End. I take the Liberty to wri[illegible] my ſelf,

Your moſt obedient humble Servant,

Cambridge, New England, Howard Colledge, May 10. 1729.

Iſaac Greenwood.

Mr.

Boſton, July 19. 1729.

MR. *Adams* and his Servant being employed to repair a Pump in this Place, about ſix o' Clock this Afternoon uncovered the Well; upon which he immediately attempted to go down, by Means only of a ſingle Rope; but had not deſcended above five or ſix Feet, before he was rendered uncapable of ſuſtaining his Weight, and without ſpeaking, or any Signals of Diſtreſs, ſlipped down ſuddenly to the upper Part of the Joint of the Pump; where being ſupported about a Minute, fetching his Breath in a very diſtreſs'd Manner, he fell to the Bottom, which was about eight or ten Feet lower, and covered with but a very few Inches of Water, without diſcovering any Signs of Life. Hereupon his Servant (*Thomas Reardon*) with great Precipitation took the Rope in his Hand, in order to deſcend to the Relief of his Maſter; but at the ſame Diſtance from the Top, met with the ſame fatal Interruption; and without diſcovering any Signs of Diſtreſs, was heard to fall to the Bottom.

The Workmen above prepared a *Third* with a Tackle about his Waſte. Upon his Deſcent he was rendered Speechleſs, and made no Signs at all, though he had agreed to it; whereupon being raiſed from the Well, he was found to have the Image of Death impreſs'd upon him; but upon the Uſe of proper Means was ſoon recovered, without remembring any thing particularly that had paſſed.

Some Hours after this the other Bodies were taken up; but, as we had before been well aſſured

it would be, with all the Marks of a violent Death upon them.

There was nothing particular relating to this Well, excepting that it was nearly ſituated to the Town-Dock, the *Reſervoir* of all the Dregs of the Neighbouring Streets; and is about 30 Feet deep, which in this Place is ſo conſiderable, that it is lower than the Surface of the Water at the greateſt Ebb. There had not been an *Air-Tube*, or Paſſage for the external Air to communicate with it for ſome conſiderable Time.

This Evening ſeveral Trials were made on *deſcending Lights*; particularly, by letting down *lighted Candles* uncovered, others incloſed in Lanthorns, and others with the Lanthorn placed in a Pail; but in all theſe Endeavours it was obſerved, that whatſoever the Circumſtances of the deſcending Light were, it never reach'd above ſix Feet.

July 20. I repeated this Evening ſuch Experiments in the *Damp* as related to *Flame*, and found the Effect much the ſame as before; *viz.* in about 6 Feet below the Top of the Well, the Flame would grow dim, and if not immediately raiſed, would change to a bluiſh Colour, and become more and more contracted or diminiſhed, till in about a Minute's Time it would be totally extinguiſhed, without any Remains or Stench accompanying the Wick. In theſe Experiments I particularly obſerved, that the *Flame* in all its Changes ſtill continued its Pyramidical Figure; nor did a quicker or ſlower Deſcent make any Alteration in theſe Circumſtances. One Experiment was very particular, relating to the Flame of a Candle.

dle. We took a common Pail, and having fix'd a Candle to the Bottom thereof, erect, about 8 Inches long, we poured as much hot Water into the Pail as reach'd within a quarter of an Inch of the Blaze of the Candle. Then having carefully lowered the Pail down the Well, the Flame, notwithſtanding it was defended by the reeking Steams of the hot Water, went out at the ſame Depth, and in the ſame Time as it did before. After this we immers'd burning Coals, flaming Brimſtone, and lighted Matches, all which were extinguiſhed with very little Difference as to the Time, or other Circumſtances.

Two Experiments were made relating to *Animal Life*. A large *Kitling* was very much affected in about a Minute's Time; and after 3 Minutes was rendred ſo weak, that after ſhe was taken out, ſhe could not ſuſtain her Weight on her Legs. Being at length pretty well recovered, we carefully bound her up in a Silk Handkerchief, that ſhe might be the more eaſily ſuſpended; and having let her down about 16 or 18 Feet, in three Minutes ſhe was affected in the like Manner as before, making a very diſtreſs'd Noiſe, and in about five Minutes was in ſuch extraordinary Convulſions as rendered the Sight not a little diſagreeable; but in theſe Throws ſhe diſengaged herſelf from the Handkerchief, falling to the Bottom, without making any Efforts to ſwim; whence we concluded they were the laſt Struggles for Life, in which ſhe broke looſe.

We tried the ſame fatal Experiment upon a ſmall Bird, which being ſuſpended in the *Damp* about three Minutes, was found entirely ſenſeleſs, and ac-

cording to all Appearance paſt Recovery. Upon taking it in my Hand, I found it was very cold, nor had it the leaſt Motion that I could diſcover; however, keeping of it cloſe between my Hands, which were pretty warm, in about a Minute I felt a ſmall Palpitation, which preſently increaſed to a ſtronger Pulſe, till in about ſix or ſeven Minutes the Bird was reſtored to a perfect and uninterrupted Reſpiration. About half an Hour after this, we again put the Bird into the *Damp*, and continued it there about five Minutes, after which we found it paſt Recovery.

July 21. I repeated ſeveral of the Experiments relating to Lights and Flame, which ſucceeded with very little, if any Alteration, as before; which we looked upon as an undoubted Confirmation of the Continuance of the *Damp*. Whereupon we proceeded; firſt, to examine the Elaſticity of the Air in the Well, by letting down a ſmall Bell, the Sound of which was as diſtinct and loud, as in any ordinary Well of the ſame Depth.

Then to diſcover the Degree of Moiſture, we took a large Spunge a little wet, which with the *Silk String*, whereby we let it down, weigh'd 278 Grains. This being ſuſpended in the *Damp*, upwards of five Minutes, and then raiſed, was carefully weigh'd, and found to be of the ſame Weight preciſely. After this we dried the *Spunge*, which then weigh'd but 261 Grains, and having applied it to the *Damp* for the Space of ten Minutes, we found alſo, that it had not gained the leaſt Part that could be perceived in its Weight. Alſo, a large Bundle of *Cat-*

gut,

gut, weighing two Ounces fifteen Penny-weight ten Grains, acquired not the leaſt Augmentation thereto, by being ſuſpended for a very conſiderable Time.

To theſe Experiments we added one upon the *Hydroſtatical Ballance*, in order to determine whether there was any extraordinary Difference as to the Denſity, or Specifick Gravity of common, and this *vitiated Air*. The *Ballance* we made uſe of was very large, and accurately poiz'd, and the *Solid*, which was a Globe, was four Inches eight tenths in Diameter. This with its String weigh'd in the Air ſeven Ounces ſix Penny-weight. And after we had immers'd it in the *Damp*, it loſt nothing of its Weight, being then *in Æquilibrio* to ſo great a Degree of Exactneſs, that half a Grain would over-ponderate on either Side.

This *Damp* abated more and more by being expoſed to the Air, till on *July* the 25th, Perſons were let down to the Bottom without any Inconvenience.

The other Inſtance is of a very ſudden Subterraneous Vapour, on *May* 9, 1729, in a Well in *School-houſe-Street*, *Boſton*.

This Well had been opened for ſome conſiderable Time; and not only enlarged in its Diameter, but ſunk fourteen or fifteen Feet deeper. Hereupon Mr. *Rennief*, and a young Man whoſe Name was *Ruſſel*, undertook to lay the Stones. They had been employ'd all the Day, till about ſix o'Clock in the Afternoon, when *Rennief* perceived a very unuſual Stench, of which he firſt upbraided his Partner as an Act of Indecency, till by the extraordinary Increaſe

Increaſe thereof, he was apprehenſive of ſome greater Danger. *Ruſſel* was hitherto unſenſible thereof, but perceiving his Partner's Viſage to change to a very uncommon Degree, call'd up for Relief; at which Inſtant, as he afterwards expreſſed himſelf, *He firſt perceived a very ſtrong noiſome Smell, reſembling rotten Fiſh, which on a ſudden ſeized his Senſes, and rendered him unable to ſuſtain his Weight.* *Rennief* had immediately cloſed his Mouth and Noſtrils with his Hand; and when the Bucket was lowered with a *third* Perſon for their Relief, aſſiſted in getting *Ruſſel* into it. As the Bucket was raiſing, *Ruſſel* was taken with very unuſual and extraordinary Fits; and when he was laid upon the Ground, till *Rennief* was taken out, could ſcarce be kept ſtill by the united Strength of three or four Perſons; but bounding and writhing his Body, like a Fiſh newly taken from the Water. *Rennief* was affected only with fainting Fits. After three Hours *Ruſſel* recovered of theſe extraordinary Convulſions, but was diſordered in his Brain during the whole Night; and though *Rennief* was ſooner relieved of his Fits, he continued extreamly diſordered for a longer Time. It was thought remarkable, that neither of them was affected with either Vomiting or Purging.

This Accident happened on *Friday*, and on the *Monday* they were both reſtored to perfect Health. The Well continued infected for a very little while, and when on the *Monday* following ſome other *Workmen* renewed the Work, there was nothing Noiſome that could be perceived.

I can-

I cannot call to Mind, that there is any Inſtance of ſuch a tranſient Vapour or Damp recorded in the *Royal Tranſactions*; and muſt confeſs I am at a Loſs how to account for it. Should there be Subterraneous Exhalations which, like the Clouds or Wind in the Atmoſphere, ſhifted from one Place to another, it might be of great Importance to obſerve the Particulars thereof, eſpecially ſuch as are *Malignant*, as this was. The Paſſage of this Vapour was about 25 Feet below the Surface; a Depth too great for it to affect Cellars or Vaults.

I had forgot to note, that this Part of the Town lies very high; and the Ground for about ten Feet, hard Clay, and the reſt a coarſe Sand and Gravel.

III. *A Letter from the King's Officers at* Sheerneſs *and* Chatham, *to the Honourable the Commiſſioners of the* Navy, *giving an Account of what they met with in opening an antient Well near* Queenborough *in* Kent, *communicated by Mr.* Peter Colliſon, *F. R. S. on* January 8, 1729.

Chatham-Dock, Octob. 9. 1723.

Right Honourable,

IN Obedience to your Honours Warrant of the 16th of *September* laſt, we met at the Well near *Queenborough*, where the Caſtle formerly ſtood, on *Tueſday* the 24th *ditto*, and finding but very little Water